

MCQ for ED University exam

UNIT 1

1. In a PN junction with no external voltage, the electric field between acceptor and donor ions is called a
 - A. Peak
 - B. Barrier**
 - C. Threshold
 - D. Path
2. In a PN junction the potential barrier is due to the charges on either side of the junction, these charges are
 - A. Majority carriers
 - B. Minority carriers
 - C. Both (a) and (b)
 - D. Fixed donor and acceptor ions**
3. The capacitance of a reverse biased PN junction
 - A. Increases as reverse bias is increased
 - B. Decreases as reverse bias is increased**
 - C. Increases as reverse bias is decreased
 - D. Is insignificantly low
4. For a PN junction diode, the current in reverse bias may be
 - A. Few miliamperes
 - B. Between 0.2 A and 15 A
 - C. Few amperes
 - D. Few micro amperes**
5. How many junction/s do a diode consist?
 - a) 0
 - b) 1**

- c) 2
- d) 3

6. If the positive terminal of the battery is connected to the anode of the diode, then it is known as

- a) Forward biased**
- b) Reverse biased
- c) Equilibrium
- d) Schottky barrier

7) During reverse bias, a small current develops known as

- a) Forward current
- b) Reverse current
- c) Reverse saturation current**
- d) Active current

8 Reverse recovery time for a diode is?

- a) Time taken to eliminate excess minority charge carriers
- b) Sum of storage time (T_s) and transition time (T_T)
- c) Time taken to eliminate excess majority charge carriers
- d) Time elapsed to return to non conduction state

View Answer

Answer: a

Explanation: The time period for which diode remains in conduction state even in reverse direction is called storage time. The time elapsed to return the non conduction state is called transition time. Their sum is called reverse recovery time.

9) During the reverse biased of the diode, the back resistance decrease with the increase of the temperature. Is it true or false?

- a) True**
- b) False

10) What is the maximum electric field when $V_{bi}=2V$, $V_R=5V$ and width of the semiconductor is 7cm?

- a) -100V/m
- b) -200V/m**
- c) 100V/m
- d) 200V/m

11) Diode acts as a short circuit when switched from forward to reverse bias for some time due to _____

- a) Accumulation of minority charge carriers when it's in forward bias
- b) Accumulation of majority charge carriers when it's in forward bias
- c) Accumulation of minority charge carriers when it's in reverse bias
- d) Accumulation of majority charge carrier when it's in reverse bias

View Answer

Answer: a

Explanation: When a diode is switched suddenly, it persists the conducting property for a short time in its reverse bias also. This leads to excess minority charge carrier settlement at potential barrier. Hence acts as a short circuit.

12)PN junction failure below 5 V is caused primarily by

- a. Avalanche breakdown
- b. Zener breakdown**
- c. Either (a) or (b)
- d. None of the above

13) In a reverse-biased PN junction, the current through the junction increases abruptly at

- a. 0.5 V
- b. 1.1 V
- c. 0.72 V
- d. Breakdown voltage**

14)The cut-in voltage for silicon diode is approximately

- a. 0.2 V
- b. 0.6 V
- c. 1.1 V
- d. 1.4 V

Answer: (b) 0.6 V

15) If the forward voltage in a semiconductor diode is doubled, the width of the depletion layer will

- a. Become half
- b. Become one-fourth
- c. Remain unchanged
- d. Become double

Answer: (a) Become half

16) The PN junction diode is used as

- a. An amplifier
- b. A rectifier**
- c. An oscillator
- d. A modulator

17) Compared to a PN junction with $N_A = 10^{14}/\text{CM}^3$, which one of the following is true for $N_A = N_D = 10^{20}/\text{CM}^3$?

- a) depletion capacitance decreases
- b) depletion capacitance increases
- c) depletion capacitance remains same
- d) depletion capacitance can't be predicted

View Answer

e. **Answer: b**

Explanation: We know, $C_T = A\epsilon/W$ and

$W \propto (1/N_A + 1/N_D)^{1/2}$. So, $C_T \propto (1/N_A + 1/N_D)^{-1/2}$

So when N_A and N_D increases, depletion capacitance C_T increases.

18) If C_T is the transition capacitance, which of the following are true?

- 1) in forward bias, C_T dominates
 - 2) in reverse bias, C_T dominates
 - 3) in forward bias, diffusion capacitance dominates
 - 4) in reverse bias, diffusion capacitance dominates
- a) 1 only
 - b) 2 only
 - c) 2 and 3
 - d) 3 only

View Answer

Answer: c

Explanation: In reverse bias condition, depletion region increases and acts as an insulator or dielectric medium. So, the transition capacitance increases. In forward bias condition, due to stored charge of minority carriers, diffusion capacitance increases.

19) The diffusion capacitance of a PN junction _____

- a) decreases with increasing current and increasing temperature
- b) decreases with decreasing current and increasing temperature
- c) increasing with increasing current and increasing temperature
- d) does not depend on current and temperature

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Answer: b

Explanation: $C_D = \tau I / n_0 V_T$

Where, I is the current and V_T is temperature factor. The diffusion capacitance is directly proportional to current and indirectly proportional to the temperature.

20) Transition capacitance is also called as _____

- a) diffusion capacitance
- b) depletion capacitance
- c) conductance capacitance
- d) resistive capacitance

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Answer: b

Explanation: Transition capacitance occurs in reverse bias. We obtain a depletion layer in that case. Hence it's also called as depletion capacitance. The diffusion capacitance occurs in forward bias.

UNIT 2

1. The advantages over the vacuum triode for a junction transistor is _____

- a) high power consumption
- b) high efficiency**
- c) large size
- d) less doping

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2. What is the left hand section of a junction transistor called?

- a) base
- b) collector
- c) emitter**
- d) depletion region

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3. In an NPN transistor, the arrow is pointed towards _____

- a) the collector

- b) the base
- c) depends on the configuration

d) the emitter

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4. Which of the following is true in construction of a transistor?

- a) the collector dissipates lesser power
- b) the emitter supplies minority carriers
- c) the collector is made physically larger than the emitter region**
- d) the collector collects minority charge carriers

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5. In the operation of an NPN transistor, the electrons cross which region?

- a) emitter region
- b) the region where there is high depletion
- c) the region where there is low depletion

d) P type base region

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6. Which of the following are true for a PNP transistor?

- a) the emitter current is less than the collector current
- b) the collector current is less than the emitter current**
- c) the electrons are majority charge carriers
- d) the holes are the minority charge carriers

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7. In the saturated region, the transistor acts like a_____

- a) poor transistor
- b) amplifier
- c) open switch

d) closed switch

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8. When does the transistor act like an open switch?

- a) cut off region**
- b) inverted region
- c) saturated region
- d) active region

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9. If the emitter-base junction is forward biased and the collector-base junction is reverse biased, what will be the region of operation for a transistor?

- a) cut off region
- b) saturated region
- c) inverted region

d) active region

[View Answer](#)

10. The transfer of a signal in a transistor is _____

- a) **low to high resistance**
- b) high to low resistance
- c) collector to base junction
- d) emitter to base junction

11. The emitter current consist of _____

- a) electrons passing from collector to emitter
- b) holes crossing from base to collector
- c) electron current I_{nE} constituted by electrons
- d) immobile charge carriers

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12. The total emitter current (I_E) is given by _____

- a) $I_E = I_{pE} * I_{nE}$
- b) $I_E = I_{pE} - I_{nE}$
- c) $I_E = I_{pE} / I_{nE}$
- d) $I_E = I_{pE} + I_{nE}$

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13. A common base transistor amplifier has an input resistance of 20Ω and output resistance of $100k\Omega$. If a signal of $400mV$ is applied between emitter and base, find the voltage amplification. Assume α_{ac} to be one.

- a) 20
- b) **50**
- c) 30
- d) 25

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14. The amplification factor for a transistor is given by _____

- a) $A = \alpha R_L / r_e$
- b) $A = \alpha R_L r_e$
- c) $A = r_e / \alpha R_L$
- d) $A = R_L / r_e \alpha$

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15. Why is the silicon mostly chosen when compared to germanium?

- a) low power consumption
- b) high efficiency
- c) greater working temperature

d) large I_{CBO}

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16 The value of α_{ac} for all practical purposes, for commercial transistors range from _____

- a) 0.5-0.6
- b) 0.7-0.77
- c) 0.8-0.88
- d) 0.9-0.99

17. A transistor has an I_C of 100mA and I_B of 0.5mA. What is the value of α_{dc} ?

- a) 0.565
- b) 0.754
- c) 1.24
- d) 0.995

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18. A germanium transistor used as an amplifier has a collector cut off current $I_{CBO}=10\mu A$ at a temperature $27^\circ C$ and $\beta=50$. What is the collector current when the base current is 0.25mA?

- a) 10.76mA
- b) 13.01mA
- c) 15.67mA
- d) 11.88Ma

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19. In a PNP germanium transistor, the cut in voltage is about _____

- a) -0.1V
- b) -0.01V
- c) -0.05V
- d) -0.07V

[View Answer](#)

20. In a PNP transistor operating in active region, the main stream of current is _____

- a) drift of holes
- b) drift of electrons
- c) diffusion of holes
- d) diffusion of electrons

In CB configuration, the value of $\alpha=0.98$. A voltage drop of 4.9V is obtained across the resistor of $5K\Omega$ when connected in collector circuit. Find the base current.

- a) 0.01mA
- b) 0.07mA
- c) 0.02mA

d) 0.05mA

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Answer: c

Explanation: Here, $I_C = 4.9/5K = 0.98mA$

$\alpha = I_C/I_E$. So,

$I_E = I_C/\alpha = 0.98/0.98 = 1mA$.

$I_B = I_E - I_C = 1 - 0.98 = 0.02mA$.

Q1: For a transistor to operate in an active region what is the essential possible condition of biasing?

- a. Collector-base and emitter-base junctions are reverse biased.
- b. Collector-base junction is reverse biased and the emitter-base is forward biased
- c. Collector-base and emitter-base junctions are forward biased
- d. Collector-base junction is forward biased and emitter-base is reverse biased

Answer: (b) Collector-base junction is reverse biased and the emitter-base is forward biased

Q2: Which operating region of BJT enables Emitter-base & collector-base junctions to undergo perfect short-circuit configuration?

- a. Saturation Region
- b. Cut-off Region
- c. Active Region
- d. None

Answer: (b) Saturation Region

Q3: When zero input control signal is applied which functional mode enables the BJT to act as an open switch?

- a. Reversed biased mode of BE junction
- b. Reversed as well as the forward-biased mode of BE junction
- c. Forward biased mode of BE junction
- d. None

Answer: (d) None

Q4: The power dissipated by a transistor approximately equals the collector current times.

- a. Collector-emitter voltage
- b. Base-emitter voltage
- c. Base supply voltage
- d. 0.7 V

Answer: (a) collector-emitter voltage

Q5: Which of the following leakage current causes a small collector current with zero base current

- a. Collector diode
- b. Base diode
- c. Emitter diode
- d. Transistor

Answer: (a) Collector diode

Q6: What will be the answer if we recalculate the collector-emitter voltage with the second approximation?

- a. The same as the ideal value
- b. Larger than the ideal value
- c. Smaller than the ideal value
- d. incorrect

Answer: (b) Larger than the ideal value

Q7: Will a transistor act as a closed switch by defining the requisite magnitude of saturation level with an equivalent amount of

- a. negative control voltage
- b. both negative & positive control voltages
- c. positive control voltage

d. none of the above

Answer: (a) positive control voltage

Q8: Which current source is connected between collector and base terminals in order to supervise the consequences of base control in an active region DC Model of BJT?

a. αI_B

b. βI_B

c. αI_E

d. βI_E

Answer: (b) βI_B

Q9: What is the collector current when the base resistor is open?

a. 1 mA

b. 2 mA

c. 0

d. 10 mA

Answer: (c) 0

Q10: For the second approximation what is the base-emitter voltage?

a. 0.3 V

b. 0.7 V

c. 0

d. 1 V

Answer: (b) 0.7 V

Q1. The emitter-base junction of a transistor is Biased while the collector-base junction is

a. Reverse, Forward

b. Reverse, Reverse

c. Forward, forward

- d. Forward, reverse

Answer: (d) Forward, reverse

Q2: A NPN transistor conducts when

- a. Both collector and emitter are positive with respect to the base
- b. Collector is positive and the emitter is negative with respect to the base
- c. Collector is positive and the emitter is at the same potential as the base
- d. Both collector and emitter are negative with respect to the base

Answer: (b) Collector is positive and the emitter is negative with respect to the base

Q3: Which of the following is true

- a. Common base transistor is commonly used because the current gain is maximum
- b. Common emitter is commonly used because the current gain is maximum
- c. Common collector is commonly used because the current gain is maximum
- d. Common emitter is the least used transistor

Answer: (b) Common emitter is commonly used because the current gain is maximum

Q4: For a common base configuration of PNP transistor $I_c/I_E = 0.98$ then the maximum current gain in common emitter configuration will be

- a. 12
- b. 24
- c. 6
- d. 5

Answer: (b) 24

Q5: In a PNP transistor working as a common-base amplifier, the current gain is 0.96 and emitter current is 7.2 mA. The base current is

- a. 0.4 mA
- b. 0.2 mA
- c. 0.29 mA
- d. 0.35 mA

Answer: (c) 0.29 mA

Q6: Which is the least doped region in a transistor?

- a. Either emitter or collector
- b. Base
- c. Emitter
- d. Collector

Answer: (b) Base

Q7: The transistors provide good power amplification when they are used in

- a. Common collector configuration
- b. Common emitter configuration
- c. Common base configuration
- d. None of these

Answer: (b) Common emitter configuration

Q8: For a transistor the parameter $\beta = 99$. The value of the parameter α is

- a. 0.9
- b. 0.99
- c. 1
- d. 9

Answer: (b) 0.99

Q9: A transistor is used in common emitter mode as an amplifier. Then

- a. The base-emitter junction will be forward biased
- b. The input signal is connected in series with the voltage applied to the base-emitter junction
- c. The base-emitter junction will be reversed biased
- d. The voltage applied to bias the base-collector junction and the input signal is connected in series

Answer: (b) The input signal is connected in series with the voltage applied to the base-emitter junction

Q10: In a PNP transistor the base is the N-region. Its width relative to the P-region is

- a. Smaller
- b. Larger
- c. Same
- d. Not related

Answer: (a) Smaller

Q1: The base of a transistor is doped

- a. Moderately
- b. Lightly
- c. Heavily
- d. None of the above

Answer: (b) Lightly

Q2: How many depletion layers are there in a transistor

- a. Four
- b. One
- c. Two
- d. Three

Answer: (c) Two

Q3: A transistor has

- a. Two p-n junctions
- b. One p-n junction
- c. Three p-n junctions
- d. Four p-n junctions

Answer: (a) Two p-n junctions

Q4: The current carries in a PNP transistor is

- a. Free electrons
- b. Acceptor ions
- c. Donor ions
- d. Holes

Answer: (d) Holes

Q5: The base-emitter junctions of a transistor is

- a. a wide depletion layer
- b. Low resistance
- c. a reverse bias
- d. None

Answer: (b) Low resistance

Q6: In a transistor the input impedance is

- a. Low
- b. Very high
- c. Almost zero
- d. High

Answer: (a) Low

Q7: The majority of the carriers from the emitter

- a. Recombine in the emitter
- b. Pass through the base of the collector
- c. Recombine in the base
- d. None of the above

Answer: (b) Pass through the base of the collector

Q8: The value of α of a transistor is

- a. More than 1
- b. Less than 1
- c. 1
- d. None of the above

Answer: (b) Less than 1

Q9: The output impedance of a transistor is

- a. High
- b. Zero
- c. Low
- d. Very low

Answer: (a) High

Q10: As the temperature of a transistor goes up, the base-emitter resistance

- a. Decreases
- b. Increases
- c. Remains the same
- d. None of the above

Answer: (a) Decreases

1. The input resistance in a CB transistor is given by _____

- a) $\Delta V_{CE}/\Delta I_B$
- b) $\Delta V_{BE}/\Delta I_B$
- c) $\Delta V_{BE}/\Delta I_C$
- d) $\Delta V_{EB}/\Delta I_E$

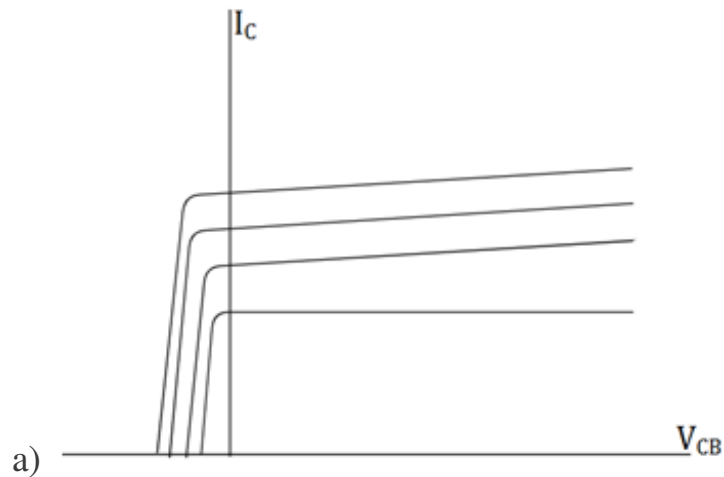
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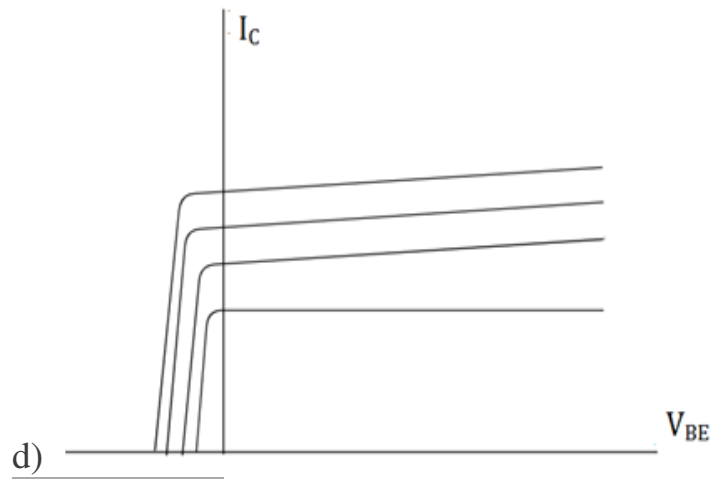
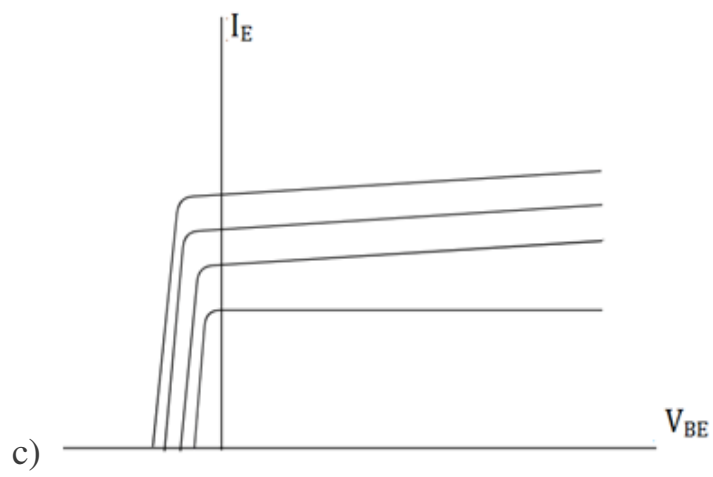
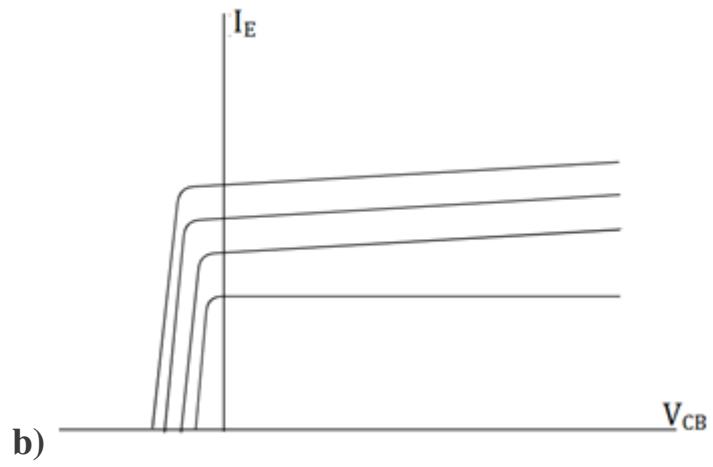
2. The output resistance of CB transistor is given by _____

- a) $\Delta V_{CB}/\Delta I_C$
- b) $\Delta V_{BE}/\Delta I_B$
- c) $\Delta V_{BE}/\Delta I_C$
- d) $\Delta V_{EB}/\Delta I_E$

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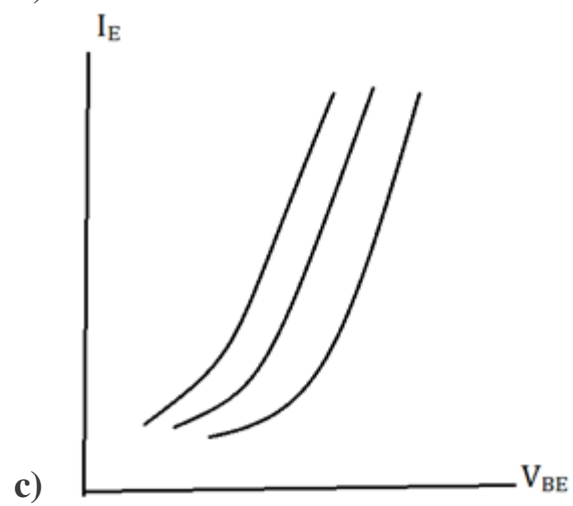
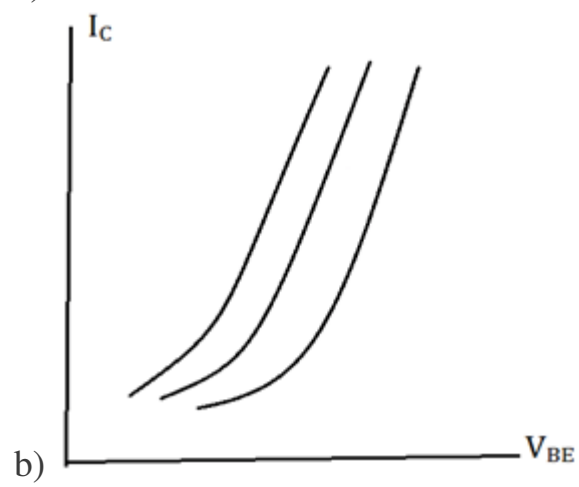
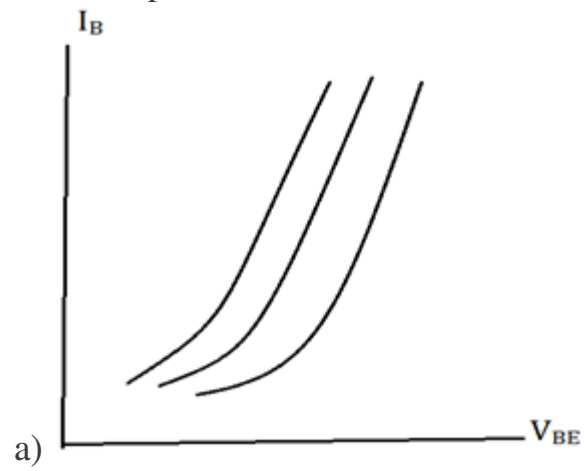
3. Which one of the following depicts the output characteristics for a CB transistor?

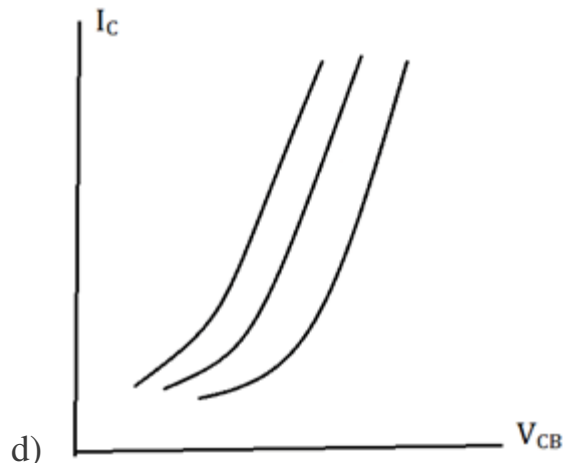




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4. The input characteristics of a CE transistor is_____





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5. A transistor is connected in CB configuration. The emitter voltage is changed by 200mV, the emitter by 5mA. During this transition the collector base voltage is kept constant. What is the input dynamic resistance?

- a) 30Ω
- b) 60Ω
- c) 40Ω**
- d) 50Ω

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6. When the collector junction is reverse biased and emitter junction is forward biased, the operating region of the transistor is called _____

- a) inverted region
- b) active region**
- c) cut off region
- d) cut in region

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7. Which of the following corresponds to the output circuit of a CB transistor?

- a) V_{BE}
- b) I_B
- c) V_{CB}**
- d) V_{CE}

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8. The input of a CB transistor is given between _____

- a) collector and emitter terminals
- b) base and collector terminals
- c) ground and emitter terminals
- d) emitter and base terminals**

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9. The current gain of the CB transistor is_____

a) less than or equal to unity

b) equal to unity

c) greater than unity

d) remains same

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10. The input characteristics of a CB transistor resembles_____

a) Forward biased diode

b) Illuminated photo diode

c) LED

d) Zener diode

UNIT 3

1. FET is a voltage controlled device.

a) True

b) False

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2. Which of the following statement is true about FET?

a) It has high output impedance

b) It has high input impedance

c) It has low input impedance

d) It does not offer any resistance

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3. Comparing the size of BJT and FET, choose the correct statement?

a) BJT is larger than the FET

b) BJT is smaller than the FET

c) Both are of same size

d) Depends on application

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4. What is the main advantage of FET which makes it more useful in industrial applications?

a) Voltage controlled operation

b) Less cost

c) Small size

d) Semiconductor device

[View Answer](#)

5. For a FET when will maximum current flows?

a) $V_{gs} = 0V$

b) $V_{gs} = 0V$ and $V_{ds} \geq |V_p|$

c) $V_{DS} \geq |V_p|$

d) $V_p = 0$

[View Answer](#)

6. What is the value of current when the gate to source voltage is less than the pinch off voltage?

a) 1A

b) 5A

c) 100A

d) 0

[View Answer](#)

7. The Shockley equation is _____

a) $I_D = (1 - V_{gs}/V_p)^2$

b) $I_D = I_{DSS} (1 - V_{gs}/V_p)^2$

c) $I_D = I_{DSS} (1 - V_{gs}/V_p)^1$

d) $I_D = I_{DSS} (1 + V_{gs}/V_p)^2$

[View Answer](#)

8. What is the value of drain current when V_{gs} =pinch off voltage?

a) 0A

b) 1A

c) 2A

d) Cannot be determined

[View Answer](#)

9. To use FET as a voltage controlled resistor, in which region it should operate?

a) Ohmic region

b) cut off

c) Saturation

d) cut off and saturation

[View Answer](#)

10. For an n-channel FET, What is the direction of current flow?

a) Source to drain

b) Drain to source

c) Gate to source

d) Gate to drain

[View Answer](#)

11. For a p-channel FET, What is the direction of current flow?

a) Source to drain

b) Drain to source

c) Gate to source

d) Gate to drain

1. For NMOS transistor which of the following is not true?

a) The substrate is of p-type semiconductor

b) Inversion layer or induced channel is of n type

c) Threshold voltage is negative

d) None of the mentioned

[View Answer](#)

2. Process transconductance parameter is directly proportional to

a) Electron mobility only

b) $(\text{Electron mobility})^{-1}$ only

c) Oxide capacitance only

d) Product of oxide capacitance and electron mobility

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3. The SI Units of the Process transconductance Parameter (k') is

a) V^2/A

b) A/V^2

c) V/A

d) A/V

[View Answer](#)

4. Aspect ratio of the MOSFET has the units of

a) No units

b) m

c) m^2

d) m^{-1}

[View Answer](#)

5. The MOSFET transconductance parameter is the product of

a) Process transconductance and inverse of aspect ratio

b) Inverse of Process transconductance and aspect ratio

c) Inverse of Process transconductance and inverse of aspect ratio

d) Process transconductance and aspect ratio

[View Answer](#)

6. With the potential difference between the source and the drain kept small (V_{DS} is small), the MOSFET behaves as a resistance whose value varies _____ with the overdrive voltage

- a) Linearly
- b) Inversely**
- c) Exponentially
- d) Logarithmically

[View Answer](#)

7. For a p channel MOSFET which of the following is not true?

- a) The source and drain are a p type semiconductor
- b) The induced channel is p type region which is induced by applying a positive potential to the gate**
- c) The substrate is a n type semiconductor
- d) None of the mentioned

[View Answer](#)

8. When the voltage across the drain and the source (V_{DS}) is increased from a small amount (assuming that the gate voltage, V_G with respect to the source is higher than the threshold voltage, V_t), then the width of the induced channel in NMOS (assume that V_{DS} is always small when compared to the V_{ov})

- a) Will remain as was before
- b) Will become non uniform and will take a tapered shape with deepest width at the drain
- c) Will become non uniform and will take a tapered shape with deepest width at the source**
- d) Will remain uniform but the width of the channel will increase

[View Answer](#)

9. The saturation current of the MOSFET is the value of the current when

- a) The voltage between the drain and drain becomes equal to the overdrive voltage**
- b) The voltage between the drain and drain becomes equal to the threshold voltage
- c) The voltage between the drain and drain becomes equal to the voltage applied to the gate
- d) The voltage between the drain and drain becomes equal to difference the overdrive voltage and the threshold voltage

[View Answer](#)

10. At channel pinch off

- a) The width of the induced channel becomes non linear
- b) The width of the induced channel becomes very large (resulting in very large resistance and very low, practically zero, current)

- c) width becomes $1/e$ times the maximum possible width
- d) The width of the induced channel becomes zero and the current saturates**

If a MOSFET is to be used in the making of an amplifier then it must work in

- a) Cut-off region**
- b) Triode region
- c) Saturation region
- d) Both cut-off and triode region can be used

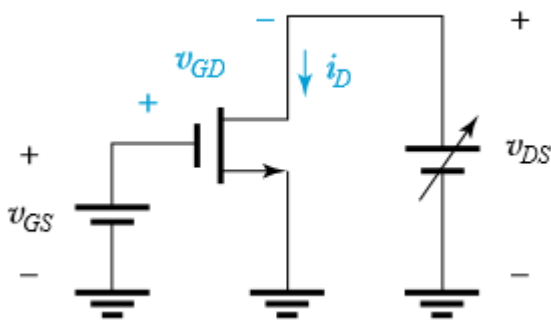
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2. For MOSFET is to be used as a switch then it must operate in

- a) Cut-off region
- b) Triode region
- c) Saturation region
- d) Both cut-off and triode region can be used**

[View Answer](#)

(Q.3 & Q.4) Using the circuit shown below,



3. Determine the conditions in which the MOSFET is operating in the triode region.

- i. $V_{GD} > V_t$ (Threshold voltage)
- ii. $V_{DS} > V_{OV}$
- iii. $I_D \propto (V_{OV} - 0.5V_{DS})V_{DS}$

a) i, ii, and iii are correct

b) i and iii are correct

c) i and ii are correct

d) ii and iii are correct

[View Answer](#)

4. Determine the conditions in which the MOSFET is operating in the saturation region

- i. $V_{GD} > V_t$ (Threshold voltage)

- ii. $V_{DS} > V_{OV}$
- iii. $I_D \propto (V_{OV})^2$
- a) i, ii, and iii are correct
- b) i and iii are correct
- c) i and ii are correct
- d) ii and iii are correct**

[View Answer](#)

5. In the saturation region of the MOSFET the saturation current is

- a) Independent of the voltage difference between the source and the drain**
- b) Depends directly on the voltage difference between the source and the drain
- c) Depends directly on the overdriving voltage
- d) Depends directly on the voltage supplied to the gate terminal

[View Answer](#)

6. An n-channel MOSFET operating with $V_{OV}=0.5V$ exhibits a linear resistance = $1\text{ k}\Omega$ when V_{DS} is very small. What is the value of the device transconductance parameter k_n ?

- a) 2 mA/V^2**
- b) 20 mA/V^2
- c) 0.2 A/V^2
- d) 2 A/V^2

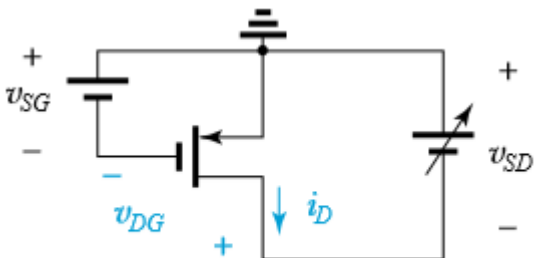
[View Answer](#)

7. An NMOS transistor is operating at the edge of saturation with an overdrive voltage V_{OV} and a drain current I_D . If V_{OV} is doubled, and we must maintain operation at the edge of saturation, what value of drain current results?

- a) $0.25I_D$
- b) $0.5I_D$
- c) $2I_D$**
- d) $4I_D$

[View Answer](#)

(Q.8-Q.10) Using the circuit below answer the question



8. Which of the following is true for the triode region?

- a. $V_{DG} > V_{tp}$
- b. $V_{SD} < V_{OV}$
- c. $I_D \propto V_{OV}$
- d. None of the mentioned**

[View Answer](#)

9. Which of the following is true for the saturation region?

- a) $V_{DG} \leq |V_{tp}|$
- b) $V_{SD} \leq |V_{OV}|$
- c) $V_{DG} < |V_{tp}|$
- d) $V_{SD} < |V_{OV}|$

[View Answer](#)

10. The current i_D

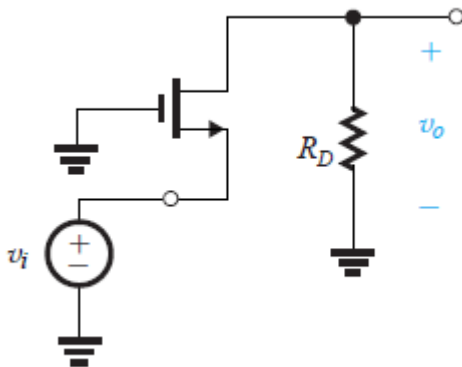
- a) Depends linearly on V_{OV} in the saturation region
- b) Depends on the square of V_{OV} in the saturation region**
- c) Depends inversely on V_{OV} in the triode region
- d) None of the mentioned

1. In which of the following configuration does a MOSFET works as an amplifier?

- a) Common Source (CS)
- b) Common Gate (CG)
- c) Common drain (CD)
- d) All of the mentioned**

[View Answer](#)

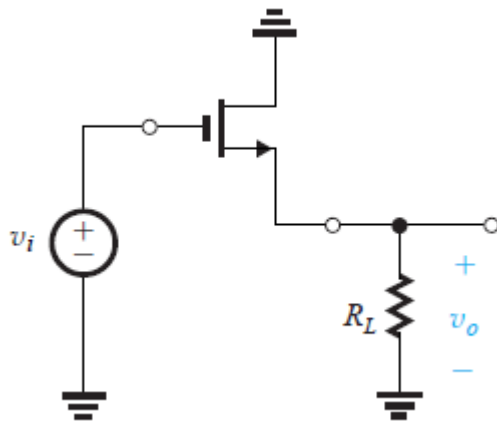
2. The MOSFET in the following circuit is in which configuration?



- a) Common Source (CS)
- b) Common Gate (CG)**
- c) Common Drain (CD)
- d) None of the mentioned

[View Answer](#)

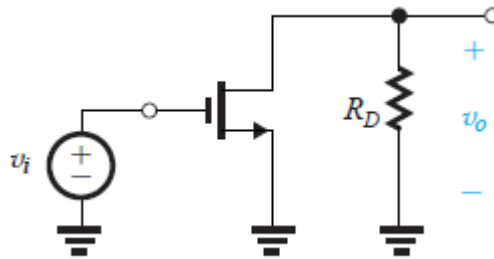
3. The MOSFET in the following circuit is in which configuration?



- a) Common Source (CS)
- b) Common Gate (CG)
- c) Common Drain (CD)**
- d) None of the mentioned

[View Answer](#)

4. The MOSFET in the following circuit is in which



configuration?[/expand]

- a) Common Source (CS)**
- b) Common Gate (CG)
- c) Common Drain (CD)
- d) None of the mentioned

Write the Hybrid parameters equation for transistor amplifier?

$$V_i = h_i I_i + h_r V_o$$

$$I_o = h_f I_i + h_o V_o$$

Select one:



True

 False

UNIT 4

1. What is the random motion of free electrons and holes due to thermal agitation called?

- a. Pressure
- b. Diffusion
- c. Ionisation
- d. None of the above

Answer: (b) Diffusion

9. Why is the mobility of free electrons greater than that of holes?

- a. They are light
- b. They mutually collide less
- c. They require low energy to continue the motion
- d. They carry negative energy

Answer: (c) They require low energy to continue the motion

10. The relation between the number of free electrons in semiconductor and its temperature is given as

- a. $n \propto T$
- b. $n \propto T^2$
- c. $n \propto T^{3/2}$
- d. $n \propto T^{-\sqrt{}}$

Answer: (c) $n \propto T^{3/2}$

11. Which of the following does the resistivity of a semiconductor depend upon?

- a. Length of the semiconductor
- b. Atomic nature of the semiconductor
- c. Shape and atomic nature of the semiconductor
- d. Shape of semiconductor

Answer: (b) Atomic nature of the semiconductor

12. Which of the following statements is true about extrinsic semiconductors?

- a. The gap between the conduction band and the valence bond is more than 16 eV
- b. The gap between the conduction band and the valence bond is about 1 eV
- c. The gap between the conduction band and valence band is 100 eV and more
- d. The conduction band and the valence band overlap.

Answer: (b) The gap between the conduction band and the valence bond is about 1 eV

Q1: In a Zener diode with a high breakdown voltage has

- a. Lightly doped P and N
- b. P or N is lightly doped
- c. Heavily doped P and N
- d. None of these

Answer: (a) Lightly doped P and N

Q2: In Zener diode, the Zener breakdown takes place

- a. Below 6 V
- b. At 6 V
- c. Above 6 V
- d. None of the above

Answer: (a) Below 6 V

Q3: Which of the following controls the current in a Zener diode?

- a. Zener diode resistance
- b. Potential barrier
- c. Reverse bias voltage
- d. External circuits

Answer: (d) External circuits

Q4: A Zener diode when biased correctly

- a. Never overheats

- b. Has a constant voltage across it
- c. Acts as a fixed resistance
- d. Has a constant current passing through it

Answer: (c) Has a constant voltage across it

Q5: In Zener diode, the breakdown is due to Zener, has a doping

- a. Lowest
- b. Moderate
- c. High
- d. Low

Answer:(c) High

Q6: In a Zener diode

- a. Negative resistance characteristic exists
- b. Forward voltage rating is high
- c. Sharp breakdown occurs at a low reverse voltage
- d. All of the above

Answer: (c) Sharp breakdown occurs at a low reverse voltage

Q7: A Zener diode, having breakdown voltage equal to 15 V, is used in a voltage regulator circuit shown in the figure. The current through the diode is

- a. 10 mA
- b. 15 mA
- c. 20 mA
- d. 5 mA

Answer: (d) 5 mA

Q8: How is the breakdown region set during the manufacturing of the diode?

- a. By controlling the size of the diode
- b. By controlling the doping of the diode
- c. By managing the biasing of diode
- d. All the above

Answer: (a) By controlling the doping of the diode

Q9: Depletion region behaves as

- a. Semiconductor
- b. Insulator
- c. Conductor
- d. High resistance

Answer: (B) Insulator

Q10: Depletion region contains

- a. Free holes
- b. Free electrons
- c. Immobile charge carriers
- d. All of the above

Answer: (c) Immobile charge carriers

Q1: The tunnel diode is mainly used

- a. For very high speed of switching
- b. To control the power
- c. For rectification
- d. For fact chopping

Answer: (a) For very high speed of switching

Q2: The Tunnel diode is best suited for

- a. Amplitude limiters
- b. Amplifiers
- c. Oscillators
- d. Rectifiers

Answer: (b) Amplifiers

Q3: The tunnelling phenomenon is also known as

- a. Bulk semiconductor phenomenon

- b. Auto electronic phenomenon
- c. Auto electric phenomenon
- d. Esaki phenomena

Answer: (b) Auto electronic phenomenon

Q4: Tunnel diode operates very fast in the region.

- a. Gamma frequency region
- b. Microwave frequency region
- c. Radiofrequency region
- d. Ultraviolet frequency region

Answer: (b) Microwave frequency region

Q5: From the following statements pick the correct statement about tunnel diode

Statement 1: It uses the property of negative conductance

Statement 2: In forward bias the fermilevel of p side becomes higher than the n side It operates at high frequency

- a. 1 only
- b. 1 and 3
- c. 3 only
- d. 2 and 3

Answer: (b) 1 and 3

Q6: Which among the following is the reason for the depletion layer of the tunnel diode to be very small?

- a. Dopants are high and it is abrupt
- b. It's used at very high-frequency ranges
- c. Uses positive conductance property
- d. Tunneling effect

Answer: (a) Dopants are high and it is abrupt

Q7: The tunnelling involves

- a. Acceleration of electron in p side

- b. Movement of electrons from the n-side of the conduction band to the p-side of the valance band
- c. Charge distribution management in both the bands
- d. Positive slope characteristic of the diode

Answer: (b) Movement of electrons from the n-side of the conduction band to the p-side of the valance band

Q8: What are the materials used to make the Tunnel diode?

- a. AlGaAs
- b. AlGaInP
- c. ZnTe
- d. Silicon and germanium materials

Answer: (d) Silicon and germanium materials

Q9: In the construction of tunnel diode, why is the pellet soldered to anode contact and a tiny dot to the cathode contact via a mesh screen?

- a. For better conduction and reduce inductance respectively
- b. For better conduction and reduce inductance respectively
- c. For heat dissipation and increase conduction respectively
- d. For heat dissipation and reduce induction respectively

Answer: (d) For heat dissipation and reduce induction respectively

Q10: For a tunnel diode, when p is the probability that the carrier crosses the barrier 'W' is the width 'e' is energy

- a. $p \propto 1/e^{(-A \cdot e \cdot w)}$
- b. $p \propto e^{(-A \cdot e \cdot w)}$
- c. $p \propto 1/e^{(A \cdot e \cdot w)}$
- d. $p \propto e^{(A \cdot e \cdot w)}$

Answer: (b) $p \propto e^{(-A \cdot e \cdot w)}$

UNIT 5

Q1. An SCR has pn junctions

1. Two
2. Three
3. Four
4. None of the above

Answer : 2

Q3. An SCR has semiconductor layers

1. Two
2. Three
3. Four
4. None of the above

Answer : 3

Q4. An SCR has three terminals viz

1. Cathode, anode, gate
2. Anode, cathode, grid
3. Anode, cathode, drain
4. None of the above

Answer : 1

Q5. An SCR behaves as a switch

1. Unidirectional
2. Bidirectional
3. Mechanical
4. None of the above

Answer : 1

Q6. An SCR is sometimes called

1. Triac
2. Diac
3. Unijunction transistor
4. Thyristor

Answer : 4

Q7. An SCR is made of

1. Germanium
2. Silicon
3. Carbon
4. None of the above

Answer : 2

Q8. In the normal operation of an SCR, anode is w.r.t. cathode

1. At zero potential
2. Negative
3. Positive

4. None of the above

Answer : 3

Q9. In normal operation of an SCR, gate isw.r.t. cathode

1. Positive
2. Negative
3. At zero potential
4. None of the above

Answer : 1

Q22. When SCR is OFF, the current in the circuit is

1. Exactly zero
2. Small leakage current
3. Large leakage current
4. None of the above

Q1. A Triac has three terminals viz

1. Drain, source, gate
2. Two main terminal and a gate terminal
3. Cathode, anode, gate
4. None of the above

Answer : 2

Q4. The V-I characteristics for a triac in the first and third quadrants are essentially identical to those of in its first quadrant

1. Transistor
2. SCR
3. UJT
4. none of the above

Answer : 2

Q5. A triac can pass a portion of half-cycle through the load

1. Only positive
2. Only negative
3. Both positive and negative
4. None of the above

Answer : 3

Q6. A diac has terminals

1. Two
2. Three
3. Four
4. None of the above

Answer : 1

Q7. A triac has semiconductor layers

1. Two
2. Three
3. Four
4. Five

Answer : 3

Q8. A diac has pn junctions

1. Four
2. Two
3. Three
4. None of the above

Answer : 2

Q9. The device that does not have the gate terminal is

1. Triac
2. FET
3. SCR
4. Diac

Answer : 4

Q10. A diac has semiconductor layers

1. Three
2. Two
3. Four
4. None of the above

Answer : 1

11. A UJT has

1. Two pn junctions
2. One pn junction
3. Three pn junctions
4. None of the above

Answer : 2

Q12. The normal way to turn on a diac is by

1. Gate current
2. Gate voltage

3. Breakover voltage
4. None of the above

Answer : 3

Q13. A diac is switch

1. An c.
2. A d.c.
3. A mechanical
4. None of the above

Answer : 1

Q14. In a UJT, the p-type emitter is doped

1. Lightly
2. Heavily
3. Moderately
4. None of the above

Answer : 2

Q15. Power electronics essentially deals with control of a.c. power at

1. Frequencies above 20 kHz
2. Frequencies above 1000 kHz
3. Frequencies less than 10 Hz
4. 50 Hz frequency

Answer : 4

Q17. When a UJT is turned ON, the resistance between emitter terminal and lower base terminal

1. Remains the same
2. Is decreased
3. Is increased
4. None of the above

Answer : 2

Q18. To turn on UJT, the forward bias on the emitter diode should be the peak point voltage

1. Less than
2. Equal to
3. More than
4. None of the above

Answer : 3

Q19. A UJT is sometimes called diode

1. Low resistance
2. High resistance
3. Single-base

4. Double-base

Answer : 4

Q20. When the temperature increases, the inter-base resistance (R_{BB}) of a UJT

1. Increases
2. Decreases
3. Remains the same
4. None of the above

Answer : 1

Q23. Between the peak point and the valley point of UJT emitter characteristics we have region

1. Saturation
2. Negative resistance
3. Cut-off
4. None of the above

Answer : 2

Q24. A diac is turned on by

1. A breakover voltage
2. Gate voltage
3. Gate current
4. None of the above

Answer : 1

Q25. The device that exhibits negative resistance region is

1. Diac
2. Triac
3. Transistor
4. UJT

Answer : 4

Q26. The UJT may be used as

1. An amplifier
2. A sawtooth generator
3. A rectifier
4. None of the above

Answer : 2

Q27. A diac is simply

1. A single junction device
2. A three junction device
3. A triac without gate terminal
4. None of the above

Answer : 3

Q28. After peak point, the UJT operates in the region

1. Cut-off
2. Saturation
3. Negative resistance
4. None of the above

Answer : 3

Q29. Which of the following is not a characteristic of UJT?

1. Intrinsic stand off ratio
2. Negative resistance
3. Peak-point voltage
4. Bilateral conduction

Answer : 4

Q30. The triac is

1. Like a bidirectional SCR
2. A four-terminal device
3. Not a thyristor
4. Answers (1) and (2)

Answer : 1

Q1. An SCR has pn junctions

5. Two
6. Three
7. Four
8. None of the above

Answer : 2

Q3. An SCR has semiconductor layers

5. Two
6. Three
7. Four
8. None of the above

Answer : 3

Q4. An SCR has three terminals viz

5. Cathode, anode, gate
6. Anode, cathode, grid
7. Anode, cathode, drain
8. None of the above

Answer : 1

Q5. An SCR behaves as a switch

5. Unidirectional
6. Bidirectional
7. Mechanical

8. None of the above

Answer : 1

Q6. An SCR is sometimes called

- 5. Triac
- 6. Diac
- 7. Unijunction transistor
- 8. Thyristor

Answer : 4

Q7. An SCR is made of

- 5. Germanium
- 6. Silicon
- 7. Carbon
- 8. None of the above

Answer : 2

Q8. In the normal operation of an SCR, anode is w.r.t. cathode

- 5. At zero potential
- 6. Negative
- 7. Positive
- 8. None of the above

Answer : 3

Q9. In normal operation of an SCR, gate isw.r.t. cathode

- 5. Positive
- 6. Negative
- 7. At zero potential
- 8. None of the above

Answer : 1

Q2. A triac is equivalent to two SCRs

- 1. In parallel
- 2. In series
- 3. In inverse-parallel
- 4. None of the above

Answer : 3

Q3. A triac is a switch

- 1. Bidirectional
- 2. Unidirectional
- 3. Mechanical
- 4. None of the above

Answer : 1

Q4)IF PN JUNCTION IS OPEN CIRCUITED ,LIGHT ENERGY IS USED TO CREATE A POTENTIAL DIFFERENCE WHICH IS PROPORTIONAL TO THE FREQUENCY AND INTENSITY OF INCIDENT LIGHT.

Q5). Light emits from pn junction because of Photovoltaic Cell

Q6)The two methods for constructing CTD(Charge Transfer Device) is

i)Charge -couple device(CCD)

ii)Bucket Brigade Device (BBD)

Q1: Photodiode is used in the detection of

- a. Visible light
- b. Invisible light
- c. No light
- d. Both visible and invisible light

Answer: (d) Both visible and invisible light

Q2: In using a photodiode as a photodetector, it is invariably reverse biased

- a. The power consumption is much reduced compared to reverse biased condition
- b. Only when the photodiode is reverse biased the incident photons produce electron-hole pairs
- c. Only if the diode is reverse biased light variations can be converted into current variations
- d. When photons are incident on the diode, the fractional change in the reverse current is much greater than the fractional change in the forward current

Answer: (d) When photons are incident on the diode, the fractional change in the reverse current is much greater than the fractional change in the forward current.

Q3: The maximum wavelength of photons that can be detected by a photodiode made by a semiconductor of bandgap 2eV is about

- a. 620 nm

- b. 700 nm
- c. 740 nm
- d. 1240 nm

Answer: (a) 620 nm

Q4: The presence of dark current decreases the sensitivity of the photodiode to light

- a. True
- b. False

Answer: (a) True

Q5: Photodiodes operate by absorption of photons or charged particles and generate a flow of current in an external circuit,..... to the incident power. The light is absorbedwith distance and isto the absorption coefficient.

- a. Proportional, exponentially, proportional
- b. Proportional, logarithmically, inversely proportional
- c. Inversely proportional, exponentially, unrelated
- d. Inversely proportional, logarithmically, proportional
- e.

Answer: (a) Proportional, exponentially, proportional

Q6: What is the reason phototransistor produces more current than a photodiode?

- a. A wider spectrum is accepted by the phototransistor than the photodiode
- b. The current produced by photons is amplified by the h_{fe} of the transistor
- c. The phototransistor can heavily doped than the photodiode
- d. At low light conditions, a photodiode is used.

Answer: (c) The current produced by photons is amplified by the h_{fe} of the transistor

Q7: In a photodiode, when there is no incident light, the reverse current is almost negligible and is called

- a. Zener current
- b. Dark current

- c. Photocurrent
- d. PIN current

Answer: (b) Dark current

Q8: Compared to a photo-diode, which of the listed advantages and disadvantages would be expected of a phototransistor

- a. Faster response and greater sensitivity
- b. Faster response and less sensitivity
- c. Slower response and greater sensitivity
- d. Slower response and less sensitivity

Answer: (c) Slower response and greater sensitivity

Q9: When a diode is forward biased, the recombination of free electron and holes produce

- a. Heat
- b. Light
- c. Radiation
- d. All the above

Answer: (d) All the above

Q10: The width of the depletion region is

- a. Directly proportional to the doping
- b. inversely proportional to the doping
- c. Independent of doping
- d. None of the above

Answer: (b) inversely proportional to the doping